Vol. 7, No. 2 May, 1956

SYSTEMS AND PROCEDURES QUARTERLY

IN THIS ISSUE

Functional Accounting—Number One Problem of Management
—*P. H. Hutchinson*

Systems Man: Technician or Architect of Management?
—*Norman A. Coan*

Is Conventional Tabulating Equipment in the Twilight Zone?
—*Charles E. Spring*

Automation of Bank Operations—*Ralph V. Saums*

Distribution Cost Control and Analysis
—*Prof. Thomas A. McGann*

What is Directed Energy in Systems?—*Jerome Barnum*

Also: Book Reviews, Worth Reading

PUBLISHED BY THE SYSTEMS AND PROCEDURES ASSOCIATION OF AMERICA

SPA Quarterly

Official Journal of the

Systems and Procedures Association of America

May 1956

"... to provide a means for the study and dissemination of knowledge relative to systems and procedures through research, discussion and publications"

— from the Association's By-Laws

VICTOR LAZZARO, *Editor*
Merrill Lynch, Pierce, Fenner & Beane
New York

RICHARD W. POMEROY, *Feature Editor*
Fairbanks Associates,
Greenwich, Conn.

S. JOSEPH SCHNEIDER, *Editorial Assistant*
IBM Corporation
Kingston Military Products Division
Kingston, N. Y.

THOMAS G. RIZZO, *Business Manager*
American Smelting & Refining Co.
New York

Associate Editors

W. G. NELSON, McCormick & Co., Baltimore

RICHARD E. BURTON, Taylor Forge and Pipe Works, Cicero, Ill.

TOM BUTLER, Gates Rubber Co., Denver

MYRON D. HIGBEE, Rotary Electric Steel Co., Detroit

R. A. DIMBERG, Allen Bradley Co., Milwaukee.

ROBERT I. STEVENS, Home Life Insurance Co., New York

T. E. AIKEN, National Tube Co., Pittsburgh

N. J. WHIPFLER, MacLean-Hunter Publishing Co., Ltd., Toronto

FRANK W. GARRETTSON, Potomac Electric Power Co., Washington

The Quarterly is published by the Systems and Procedures Association of America, Box 281, Wall Street Station, New York. Subscription rates: Two years, $6.75; one year $3.75; single copies $1.

All reprinting rights reserved. Contents copyrighted, 1956, by the Systems and Procedures Association of America.

Functional Accounting

Cost Accounting is the number one problem of management, because to maintain profit, costs have to be controlled.

by P. H. Hutchinson

MANY PEOPLE think of Cost Accounting as a branch of Industrial Accounting with its use limited strictly to manufacturing enterprises. This is a fallacy. Costs are important in every business. It is probably true that the average manufacturing company being larger than the average wholesale or retail company, felt the need for Cost Accounting sooner and to a greater extent, and as a result developed the first accounting practices to record and control costs.

Most of the cost control in smaller companies is handled by the management using past operating experience and any available facts and figures to arrive at decisions. The number of businesses which do not have accurate monthly figures of profit and loss is surprising. Such businesses have to wait until a physical inventory is taken to know how they stand.

To emphasize the importance of Cost Accounting, suppose the name were changed from "Cost Accounting" to "Accounting for Costs"? By this simple rearrangement of words the subject is taken out of the accounting department and laid in the lap of the management; not as *a* management problem but as *the* number one problem of management, because to maintain profit in a period of rising prices, costs have to be controlled.

In these days when nearly everything is being stated mathematically, Cost might be expressed as follows:

S — (P + T) = C . . . . that is *Sales* less (*Profit* plus *Taxes*) equals *Cost*.

This formula may satisfy the auditor who is only interested in Actual Cost, or the money that came out of the bank account, in preparing a Financial Statement as a record of past events. It has little or no value as a guide to future profit planning. Actual Costs may not be reasonable costs which raises the question as to what the cost should have been. The mathematician given this angle of the problem would write a new formula as follows:

S — (P+T) = C + W. . . .that is *Sales* less (*Profit* plus *Taxes*) equals *Cost* plus *Waste*.

The problem is to discover what is reasonable cost and what is waste.

Costs result from expenditures which somebody approved, or was supposed to approve. To control costs the number of people authorized to spend money must be limited and those who are authorized to spend must be held responsible for what is spent. This approach originates the practice of Responsibility Accounting as a means of Accounting for Costs. The affiliated term "Functional Accounting" refers to the medium by which those who are responsible can control costs by pinpointing the expenditures to the functions, operations or purposes for which the money is spent.

Expenditures can and should be associated with specific functions of a business. A function should be the exclusive responsibility of a specific officer or employee. When expenditures are classified by the function and the

responsible individual the most important step towards Cost Control has been taken. If the responsible individual is required to make a forecast of what is to be spent and what is to be accomplished by the expenditure, then an advanced stage of Cost Control is reached through "Functional Budgeting".

Hypothetical Company

To get a clear picture and a good understanding of Functional and Responsibility Accounting there follows an outline of an actual practice in the form of a Functional Accounting plan for an imaginary company, called The Hypothetical Company.

The Hypothetical Company markets numerous products, in three product classes, in a scattered territory including both city and rural areas. They own their own office and warehouse building and delivery equipment. The business is divided into the following departments:

(1). Administration.
(2). Building operation.
(3). Purchasing.
(4). Sales.
(5). Office and Accounting.
(6). Automotive.
(7). Stock receiving, storage and handling.
(8). Packing and shipping.

The products handled fall into three different classes or marketing departments:

(10). Staples.
(20). Luxuries.
(30). Sundries.

Functional Classification

A set of books and a Chart of Accounts are needed. Since the business is to be run on a functional basis a functional classification of accounts will be used and, since a numerical classification eliminates writing long account titles, the classification will be numerical. The numbering system will be simple so that all who have to use it will be able to memorize it. The memorizing of several hundred account numbers would seem at first to present a problem but it need not be as difficult as it seems. If the classification is properly designed, no one outside of the accounting department will have to remember more than eight or ten numbers. The reason for the simplicity is that the numbers used are a combination of department numbers and primary expense account numbers. The primary expense account number for a class of expense will always be the same regardless of the department making the expenditure, so it is only necessary to prefix the department number to multiply a few primary expense numbers into several hundred cost or expense accounts.

The numbering system starts by allocating series of numbers to the principal groupings of accounts, as follows:

1— 99 Primary expense accounts;
101—199 Asset accounts;
201—299 Liability accounts;
301—399 Sales and Cost-of-sales accounts;
401—499 Other income and deduction accounts;
501—599 Departmental cost prefixes;
901—999 Subsidiary property and equipment accounts.

The second step in the numbering system is to subdivide the series into classes within the major groupings, as follows:

Primary expense accounts:
11— 29 Personal services—Salaries, wages, commissions and fringe benefits;
31— 49 Operating supplies and expenses;
etc.

Asset accounts:
101—109 Cash and investments;
111—119 Accounts receivable;
etc.

Liability accounts:
211—219 Accounts payable;
221—229 Notes payable;
etc.

Sales and cost-of-sales accounts:
311—Staples—Sales;
312—Staples—Cost-of-sales;
etc.

Departmental cost prefixes—These numbers are a combination of the cost or expense series number "500" and the department number, as follows:

501 (500 and 1) Administration;
502 (500 and 2) Building operation;
503 (500 and 3) Purchasing;
504 (500 and 4) Sales;
505 (500 and 5) Office and accounting;
506 (500 and 6) Automotive;
507 (500 and 7) Stock receiving, storage and handling;
508 (500 and 8) Packing and shipping;

Chart of Accounts

In using the departmental cost prefixes the three digit series numbers are increased to five digits by appending the primary expense account number, as follows:

501 11 Administration—Salaries of Officers;
504 13 Sales—Salesmen's commissions; and,
505 11 Office and accounting—Clerical salaries

In designing the Chart of Accounts, the groupings and terminal digits of related or offsetting accounts should be

similar, to facilitate memorization. For example, Accounts Receivable in the Asset series should be related numerically with Accounts Payable in the Liability Series. A further example is that Property Accounts in the Asset series should be related to the Obsolescence and Replacements Reserve Acounts in the Liability series, to the Provision for Obsolescence and Replacements Expense Accounts in the Primary Expense series, and to the related Repairs and Maintenance Expense Accounts in the Primary Expense series. Specifically, if the Automotive Property and Equipment Account is "186", the Reserve Account should be "286", the Provision Expense Account should be "86", and the Repairs Account "56".

Classified Accounts

It is often said that a chain is as strong as the weakest link. That link in accounting is usually the classification of expenditures to the primary expense accounts. The classification must be accurate and consistent. The classification can be compared to the address on a letter. As the letter in the Post Office is deposited in the bag labelled for the town to which the letter is destined, so the charge is posted to the classified account. At the end of the month all the charges accumulated in an account are for a particular block on the monthly report. The accuracy and significance of any total figure on the monthly report is only equal to the accuracy of the original classification of the several disbursements making up the amount.

Consider how the Chart of Accounts is used under the functional accounting plan. Every expense item is charged to the appropriate primary expense account in the department of the person responsible for the expenditure. Gasoline for a truck would be charged to the Operating Expense Account of the Automotive Department, regardless of the Marketing Department the gasoline will be used to serve. All expenditures are charged to the departments incurring the expense so that the detailed cost of operating the departments will be known, and can be controlled. When the posting work for the month is completed the totals of the accounts are transcribed to a Monthly Operating Report on which the total direct expense of each department is obtained by totaling the columns of the report.

Redistribution of Costs

The next step in functional accounting is the redistribution of the total direct costs of the Operating and Service Departments to the Marketing Departments. Since only the Marketing Departments earn income they must pay the expenses of the Operating and Service Departments which do not have income. To be realistic they should pay for service received on a measured basis, and in doing so they should each pay their equitable share of the total expenses of the servicing departments. To redistribute costs on this basis a unit of measure is necessary for each service rendered. A distribution rate is established which, when multiplied by the units of service rendered, will redistribute the total cost of the department rendering the service.

The units of measure to be used will vary in each department depending upon the nature of the service each renders. An example of units commonly used and how they are arrived at is as follows:

Building operations: The square foot of assigned floor space.

Purchasing Department: Each purchase order placed, multiplied by a factor to qualify the complexity of the class of purchase. Luxuries may require twice as much time and Sundries three times as much, as orders for Staples.

Sales Department: The budgeted gross margin dollar.

Office and Accounting Department: The invoice line or item.

Automotive Department: The truck hour or car mile.

Stock receiving, Storage and Handling Department: A percentage of the cost of goods sold, based on the weight handled for each Marketing Department during a representative experience period.

Packing and Shipping Department: A percentage ratio based on a work measurement study combined with the weight handled for each Marketing Department during a representative experience period.

Administrative expense is not usually distributed to Marketing Departments because any such distribution would be purely arbitrary and not likely to reflect a true and equitable distribution. Moreover administrative expense is not a cost which can be controlled by the individual responsible for the operations of a Marketing Department.

Once the unit of measure has been established it is not difficult to arrive at a distribution rate. In the Office and Accounting Department for example, a count would be made of the lines or items handled during the prior six or twelve months. The result of the count would be divided into the total operating cost of the Office, to arrive at a distribution rate per line or item. Each month thereafter the lines or items handled for a Marketing Department would be multiplied by this standard rate to arrive at the monthly charge for Office and Accounting Service. There is no fixed period recommended for computing rates but the longer the period the more stable the rate will be, because seasonal fluctuations will have been eliminated. A rate based on a long period of experience becomes a standard or budget against which actual current costs can be measured to determine efficiency and control increasing costs.

THE HYPOTHETICAL COMPANY
RICHMOND, VIRGINIA

OPERATING REPORT

For the TWO Month period ended: FEBRUARY 28 19 5 --

Line No.	TOTAL THIS MONTH	TOTAL YEAR-TO-DATE	DESCRIPTION GROUP	ACCOUNT TITLE	Acct. No.	OPERATING AND SERVICE DEPARTMENTS: ADMINISTRATION 501	BUILDINGS OPERATIONS 502	PURCHASING 503	SALES 504	OFFICE AND ACCOUNTING 505	AUTOMOTIVE 506	STOCK RECVG. STORAGE AND HANDLING 507	PACKING & SHIPPING 508	MARKETING DEPARTMENTS: STAPLES 510	LUXURIES 520	SUNDRIES 530	Acct. No.
1	280,229.48	438,532.35		SALES	1									278,363.25	97,782.45	62,386.65	1
2	161,213.74	307,073.79		COST OF SALES	2									201,099.08	64,589.61	41,591.10	2
3	69,015.74	131,458.56		GROSS MARGIN										77,270.17	33,192.84	20,795.55	
4	24,193.42	46,082.70	SALARIES AND WAGES	SALARIES	11	21,765.00		3,846.27	4,602.75	5,067.51	750.00	918.48	632.60				
5	3,454.25	6,579.52		WAGES	12						618.38	2,802.72	3,158.42	5,129.21	2,345.10	1,025.78	11
6	2,307.10	4,395.48		COMMISSIONS	13												12
7				BONUSES	14				1,364.76					1,472.20	927.85	628.67	13
8	474.37	905.56		OVERTIME AND PREMIUM PAY	15												14
9	30,429.14	57,959.26		TOTAL		21,765.00		3,846.27	5,967.51	582.69	217.31		305.56				15
10	40.00	76.50	FRINGE BENEFITS	ALLOWED TIME - SICKNESS	21					5,650.20	1,585.69	3,721.20	4,054.58	6,601.41	3,272.85	1,654.25	
11	187.05	356.29		ALLOWED TIME - HOLIDAYS AND VACATIONS	22					76.50							
12	2,769.80	5,275.82		EMPLOYEE BENEFITS AND RETIREMENT FUNDS	23	2,228.04				126.69							21
13	301.14	573.60		SOCIAL INSURANCE BENEFITS	24	217.65		401.54	492.57	126.04	34.21	95.05	102.36				22
14				EMPLOYEE WELFARE EXPENSE	25			58.46	59.68	50.68	197.75	279.18	307.46	436.44	349.10	256.80	23
15	864.44	1,646.56		SOCIAL SECURITY TAXES	26	495.77					13.68	37.21	40.95	66.01	52.75	16.55	24
16	128.20	244.19		COMPENSATION AND LIABILITY INSURANCE	27	72.00		154.57	210.20	141.86	45.15	96.12	103.15				25
17	4,290.63	8,172.96		TOTAL				11.75	17.78	6.72	39.29	30.58	33.72	237.67	107.68	56.44	26
18	3,650.87	6,954.08	OPERATING EXPENSES	TRAVEL EXPENSE	31	3,015.16		606.30	780.25	728.69	330.08	536.12	587.64	18.91	8.54	4.52	27
19	759.61	1,446.88		ENTERTAINMENT OF CUSTOMERS	32	1,521.28		142.86	788.54	19.81	55.80			759.05	498.00	334.31	
20	499.95	952.25		SALES MATERIALS AND EXPENSES	33	1,028.12			140.60					2,816.86	916.66	712.21	31
21	410.75	782.55		SALES POLICY CHANGES	34				518.86					156.01	74.15	68.20	32
22	491.22	935.66		OPERATING SUPPLIES	35				127.74					216.53	301.88	114.98	33
23	36.90	70.34		LOSS AND DAMAGE EXPENSE	36				72.16	184.39				509.59	88.20	56.82	34
24				TOOLS AND EQUIPMENT	37							679.11					35
25				WAREHOUSE EXPENSE - INTERNAL	38							70.34					36
26	433.69	433.69		WAREHOUSE CHARGES - PAID OUT	39												37
27	347.48	661.87		MISCELLANEOUS OPERATING EXPENSES	40	21.44	33.05	21.64	492.97							433.69	38
28	369.43	703.67		POWER AND LIGHT	41		166.64					92.77					39
29	247.37	471.18		FUEL, GAS AND WATER	42		597.66			284.09	86.16	166.64					40
30	1,108.53	2,111.49		GAS, OIL AND LUBRICANTS	43	56.80				74.12							41
31	158.37	301.65		TIRES AND TUBES	44						2,011.20	43.49					42
32	20.00	45.00		AUTOMOTIVE PARKING AND STORAGE	45						301.65						43
33	65.56	121.08		MISCELLANEOUS TRUCK AND AUTO EXPENSE	46						45.00						44
34	396.55	755.35		FREIGHT, EXPRESS AND CARTAGE - IN	47	6.36			32.82	5.46	121.08	14.27		321.19	274.16	88.46	45
35	981.42	1,869.37		FREIGHT, EXPRESS AND CARTAGE - OUT	48						14.63						46
36	9,975.66	18,615.87		TOTAL		2,634.00	596.75	164.50	1,975.49	565.81	2,615.52	317.37	1,869.27				47
37	45.00	95.52	REPAIRS AND MAINTENANCE	REPAIRS AND MAINTENANCE - GROUNDS	51		95.52						2,618.82	4,000.18	1,655.07	1,474.56	48
38	817.50	1,001.87		REPAIRS AND MAINTENANCE - BUILDING 1	52		284.84										
39	108.28	108.28		REPAIRS AND MAINTENANCE - BUILDING 2	53		1,001.87										51
40		47.64		REPAIRS AND MAINTENANCE - FURNITURE AND FIXTURES	54												52
41	319.45	608.47		REPAIRS AND MAINTENANCE - OFFICE EQUIPMENT	55					47.64		108.28					53
42	116.55	222.12		REPAIRS AND MAINTENANCE - AUTOMOTIVE EQUIPMENT	56						608.47						54
43	1,406.78	2,360.74		REPAIRS AND MAINTENANCE - WAREHOUSE EQUIPMENT	57							154.72	67.40				55
44	3,991.59	7,602.65		TOTAL			1,382.23			47.64	608.47	265.00	67.40				56
45	451.18	859.40	GENERAL EXPENSES	ADVERTISING	61	1,108.66											57
46	667.54	1,271.50		ASSOCIATION DUES AND SUBSCRIPTIONS	62	525.30			1,244.66								
47	472.48	899.96		PRINTING AND STATIONERY	63			46.00	225.10	65.00				5,216.11	1,144.24	889.18	61
48	1,054.02	1,969.56		OFFICE SUPPLIES AND EXPENSES	64				492.31	746.28							62
49	580.00	1,104.78		POSTAGE	65			78.93	91.95	661.22			52.31				63
50	53.07	101.09		TELEPHONE AND TELEGRAPH	66	67.38			312.37	401.52		67.98					64
51	294.32	560.60		MISCELLANEOUS GENERAL EXPENSES	70	101.89		119.66	282.51	588.86		17.07	1,238.60				65
52	1.17	(.99)		INTEREST AND BANK CHARGES	71	560.60					22.58	24.15					66
53	47.05	89.66		OVERAGES AND SHORTAGES	72												70
54		(312.00)		COLLECTION EXPENSE	73					(.99)							71
55	450.00	672.00		LOSS ON BAD DEBTS WRITTEN-OFF	74					89.66							72
56	244.09	484.78		PROFESSIONAL SERVICES	75	672.00				(312.00)							73
57	4,266.51	15,282.99		REARRANGEMENT OF FACILITIES	76												74
58	225.00	450.00		TOTAL													75
59	1,104.66	1,575.16	FIXED EXPENSES	RENT	81	3,053.09		244.49	2,648.48	125.81	107.70	232.17					76
60	1,488.20	1,750.24		GENERAL TAXES	82					2,565.46	129.68	341.41	1,270.91	3,216.11	1,344.24	889.18	
61	505.75	1,699.37		LICENCES	89	45.00	454.15				200.00	250.00					81
62	268.50	537.75		GENERAL INSURANCE	84	77.25				105.00				568.24	248.61	160.16	82
63	1,157.10	2,274.15		PROVISION FOR REPLACEMENT OF PROPERTY	85	63.79	151.26				367.75			641.10	566.10	278.04	83
64	25.00	50.00		PROVISION FOR REPLACEMENT OF EQUIPMENT	86		537.75			145.35	472.17	624.15		145.29	57.14	42.22	84
65	4,752.21	8,514.65		EQUIPMENT RENTALS	87												85
66				TOTAL						335.75	1,750.40	180.00	50.00				86
67	59,140.79	110,714.47		TOTAL DIRECT EXPENSES		186.64	1,145.14						50.00				87
68						30,631.23	5,122.12	4,861.56	11,369.71	584.10	2,770.32	1,054.15	80.00	1,352.63	665.85	480.42	
69			REDISTRIBUTION OF OPERATING AND SERVICE DEPARTMENT EXPENSES	REDISTRIBUTED EXPENSE - BUILDINGS OPERATIONS	92					9,761.50	8,059.76	6,233.25	8,719.55	15,925.56	7,234.11	4,852.72	
70				REDISTRIBUTED EXPENSE - PURCHASING	93		(5,600.00)										
71				REDISTRIBUTED EXPENSE - SALES	94			(4,546.00)						2,000.00	1,000.00	600.00	92
72				REDISTRIBUTED EXPENSE - OFFICE AND ACCOUNTING	95				(11,369.71)					2,610.00	1,288.00	1,248.00	93
73				REDISTRIBUTED EXPENSE - AUTOMOTIVE	96					(9,117.00)				6,821.83	2,842.43	1,705.45	94
74				REDISTRIBUTED EXPENSE - STOCK ... HANDLING	97						(8,415.50)			4,176.00	2,445.00	2,496.00	95
75				REDISTRIBUTED EXPENSE - PACKING AND SHIPPING	98							(5,909.11		5,045.50	2,104.00	1,262.00	96
75	59,140.79	110,714.47		TOTAL EXPENSES		30,631.23	(477.88)	315.56		624.50	(575.76)	324.14	(9,000.00)	3,384.12	1,547.82	977.17	97
76	9,875.01	20,744.09		PROFIT OR (LOSS) BEFORE INCOME TAXES		(30,631.23)	477.88	(315.56)		(624.50)	575.76	(324.14)	280.65	4,500.00	2,700.00	1,800.00	98
														43,870.81	21,161.36	14,921.34	
														33,995.36	12,231.48	5,874.21	

Functional Accounting Form

It must be realized that when units of measure and distribution rates are used the costs of the Operating and Service Departments will not be wiped out monthly as they would be under the Clearing Account principle. To accomplish the objective of controlling costs, it is not advisable to wipe out the total costs. Whatever balance remains against a Department after the redistribution has been made represents an unfavorable variation from the standard cost which should be shown to management and explained. Another advantage in this method of redistribution is that the method automatically places the Marketing Departments on an "Accrual" accounting basis with the Operating Report reflecting a truer departmental profit or loss figure each month, because the Departments are being charged only for the actual service rendered during the period, regardless of whether it has already been paid or has to be paid later. When the books are closed at the end of the fiscal year, all remaining balances are distributed to the Marketing Departments as a "Mark-up" or "Mark-down" of the original distribution and the rates are adjusted for the coming year. The adjustment of rates does not have to be delayed until the end of the fiscal year. If it is noted during the year that a rate is out-of-line it can be adjusted upward or downward as need be. However a rate should not be raised just to get rid of an over-expended balance; before the rate is raised it should be definitely determined as to whether the rate is too low or the cost is too high. If the cost is too high then all possible steps should be taken to reduce it.

The procedure for redistributing the costs of the Operating and Service Departments to the Marketing Departments should be arranged so that the progressive year-to-date totals of the departmental records will not be disturbed, nor the grand totals of sales and expenses distorted, by the redistribution. The balances of the departmental expense accounts should not be closed out monthly by the redistribution as if they were clearing accounts. If this is done there will be no progressive year-to-date totals of the departmental costs. The total amount of the expenses redistributed should be credited to a contra expense account under the Operating or Service Department and charged to appropriate operating expense contra accounts in the Marketing Departments. If, upon occasion, a redistributed expense item is charged to a primary expense account in a Marketing Department then the corresponding credit should be to the same primary expense account in the Operating Department, and not to the contra account; so that the grand total for the Company, for the particular expense classification, will not be distorted when the totals of all departments are added together.

The simplest form has been used in developing the functional accounting plan for the Hypothetical Company so that the fundamentals of the plan can be easily followed through to the end result, as illustrated in the hypothetical Monthly Report. It can be readily seen how the plan can be expanded. Just as the departments in a manufacturing company are broken down into cost centers, so the marketing departments of a commercial concern can be sub-divided into territories and branches by simply adding a territory or branch number to the departmental cost prefix. For example, 1500 would be territory one, 2500 would be territory two, 3500 would be territory three, and so on. There can be as many Operating and Service Departments as are needed; major departments can be sub-divided into divisions in the manner outlined above for territories and branches.

The outlined principles of Functional Accounting and Responsibility Accounting given are not new. They have been followed by some Companies for many years and they are currently being considered by many concerns who are planning a reorganization of their accounting procedures. This is merely an attempt to explain the plan in its simplest form for the benefit of those who may be interested in using the fundamentals as a basis on which to build a specific and more elaborate plan for their own use. **s/p/a**

Patrick H. Hutchinson is director of Management Services with Andrews, Burket & Co., certified public accountants of Richmond, Virginia. His experience since 1920 has been in accounting, finance, sales promotion and administration with several outstanding organizations in the fields of finance, commerce, industry and public service. He has progressively held positions as chief accountant, supervisor of internal auditing, director of methods and procedures, assistant treasurer, general auditor, commercial manager and general financial manager. He also spent a number of years as a mechanical accounting systems analyst and designer with one of the leading accounting machine manufacturers on their home office promotional staff.

The firm with which he is now connected was known as T. Coleman Andrews & Co. until 1953 when Mr. Andrews withdrew to accept the appointment in Washington as U. S. Commissioner of Internal Revenue. Mr. Hutchinson was first associated with T. Coleman Andrews on special reorganization work in Richmond, Va., and Kansas City, Mo., between 1938 and 1942. He finally joined the firm to take over their Management Services work in 1951. Mr. Hutchinson is a charter member of the Richmond Chapter of S.P.A. and is at present serving his Chapter as national director. He is also a member of N.A.C.A. with whom he served as a chapter director for several years.

Systems Man:

Technician or Architect of

Coordinating all managerial efforts toward the goal of profits is the ultimate aim

THE SYSTEMS part of an organization is not easy to set up and get operating. There are two main reasons for this. One is management's technical innocence of what systems are and how to set them up and how to use them. The other reason is traceable to systems men because of some of the puny and misguided efforts they themselves have directed towards management under the name of systems. To me systems is all-inclusive. It is the nerve system, the tendons—in fact, it is very near the life of management itself.

Formula for Profits

Perhaps we had better get some definition of terms, and under this heading, I am going to start at what I consider to be the top definition, and that is one of the faults of systems departments and individuals by and large, for they don't start at the top nor reach to the bottom. They hang around somewhere in the middle and quite often can be accused of not seeing the woods for the trees.

Let's start with a formula for profits. The nearest I have been able to come to a formula for profits is two simultaneous equations which indicate an attitude towards profits and not profits themselves. They are:

1. Market, plus plant, plus management, equals philosophy.
2. Philosophy, plus policy, plus figures, equals attitude towards and objective for profit.

We must start that far up the line before we think of systems. The reason is there are a great many specialties existing within systems itself. This is getting close to the heart of one of the major faults of a number of the systems men. They are too often individual tradesmen, and not enough architects of overall business systems and philosophy.

Once we knew a very good systems man whom we nicknamed "Fifty Bank Adding Machine." No matter what area of the company he worked in, he always ended up by putting the mechanics of doing the work on a multiple bank adding machine. Try as you might, you could not get that man to think in any other direction.

One must start with understanding the general overall philosophy of the business. This has to be made up from a management concept of what they are going to do in certain markets and with certain plants. Having this philosophy, then systems can come in and help shape management policies, which, plus figures for performance, become the operating sinews of management built in through systems. We then can measure performance against profit objective. Thus, system plays a major part, for though the systems group may be made up of certain specialists, the overall concept of systems in the company is not limited to "fifty bank adding machines."

Definition of Systems

As a definition of systems and procedures, I rather like the one in H. John Ross's book *Techniques of Systems and Procedures*. "Systems is that which enables management to fulfill organization purpose." Also, "A procedure is a formal instruction written or charted which governs the operations comprising a system."

We might go over to the field of national sports and say that philosophy, market and plant can be illustrated by a group of individuals who decide to go into pro-

Management?

by Norman A. Coan

fessional sport. Looking the situation over, they make the decision they will purchase a professional football team. This is the philosophy of doing business. They did not decide to play hockey, basketball or baseball, but they decided to play national pro football. We might better say that the choice to play football was the philosophy and the decision to play national professional football was the policy.

Coordination of Efforts

Then comes the concept of getting a management for the team. Additional philosophy and policy is handed down to this management to the effect that they want a winning team and are willing to spend some money for good players, and that they expect results within a few years.

In my opinion the complete coordination of all managerial efforts towards the goal of *profits* is the ultimate aim of systems and procedures. As such, it must transcend simple paperwork studies, simple written procedures, and it must go far enough to include the concept of the philosophy, objective, policies and management thinking in any company.

One of the biggest faults of systems men is there are too many specialists who may work on one tree in a group of many and then say that this tree is all there is to the woods. Actually the woods are much greater than one tree, and there are many kinds of trees in it. The best advice one can give to a group of systems men, would be to get out of your shells, get out of your little tents and try to get the overall picture of management before you attempt to apply the techniques of systems to it. Too many are running to the president saying—"Look, Mr. President, if you will have everybody's pencil sharpened 5 minutes before 8:00, you will save 5 minutes of everybody's time, and if these pencils are so sharpened, the company will make more profit." Undoubtedly many systems men know that a lot of their work is devoted towards the pencil-sharpening type rather than the broad-scale job of trying to help management run the business.

Need for Flexibility

Quite often systems men are like the English army generals in the Revolutionary days. They only knew one way to fight, and that was to form an open square of soldiers and fire in all directions when anybody charged. You know how it was when they got into the woods with the Indians and the Frontiersmen. They were not flexible, they could not realize that conditions had changed and just like "Fifty Bank Adding Machine," they couldn't conceive of any other way of fighting than to keep the Redcoats in an open square. Admittedly, they had the best open square of any army in the world—the difference being, of course, that their enemy did not fight in open squares.

I am sure that some of you may have seen some awfully good systems work expended on credit department activity. Here is an area where systems men really go over backwards, I have seen systems men install a credit system where every order was stamped, approved for credit, and every single account was punched on tabulator cards, and daily agings run off for every account. Upon examination it was found that they were stamping orders from accounts like Sears Roebuck, "credit approved." every day. It was also found that over 85% of the company's accounts paid promptly. Now regardless of how good the system of the daily aging of accounts receivable is, I ask you—Why do you have to stamp "credit approved" on every order from Sears Roebuck, and why do you have to go through the rat race of daily aging of accounts receivable when 85% of them had never caused any trouble at all? Obviously here is a case of beautiful systems which are largely unnecessary. This again illustrates my point where too many systems men get such a yen for, or get so worked up on systems itself that they fail to see where the system, even though good, is not needed.

Small and Growing Firms

You perhaps know many illustrations of this, particularly when small and growing firms neglect systems work, as they usually do, and get in a mess with their paperwork methods and practices. At this point a bright young salesman from some mechanical paperwork handling gadget company comes in and sells them his mechanical

operation. You know what happens here in many cases. Before the operations can be reduced to any mechanical process, they have to be systematized. The mechanical appliance salesman says that the mechanical device is necessary to operate these systems and procedures. In many cases like this, the facts are that once having actually systematized the practices, they could be done more economically manually than with the mechanical device. In such cases, management may praise very highly the mechanical device, yet a good systems man could show them that it was the system and not the mechanical device that accomplished the economies.

Better Operating Information

I can tell you about one company where systems men worked their hearts out to put in independent systems on production planning, standard setups in the issuance of standards, and accounting setups. In each case the result was good systems work insofar as the specific operation went. But the smartest systems man of all came along later and saw that each of these had been worked up separately and not in conjunction one with the other. He therefore took the whole story and tied in the practices of Production Planning, Industrial Engineering and Industrial Accounting, eliminated one-third of the people and got the work done in a much better fashion, more economically and what is more important, gave better operating information to management.

By all means systems should be pointed towards team play. Too many systems men work on individual areas of companies and fail to see the tie-in. Furthermore, too many cases exist where systems men placed emphasis on their systems and adopted a holier-than-thou attitude because they thought of the system at all. Actually such a lack of objectivity hurts the progress of systems and procedures work within a company.

The right approach is to work on the coordinated end of it and to take the spotlight off of the systems work itself. Systems work should be done in a manner in which the operating people understand it, buy it and even sell it themselves. The system should be so designed that it gives the operators a tool and provides them with better means to work together, just like the guard, tackle and end on a football team.

Administrative managements, it seems, should more readily understand and accept the concept of specialized skills and their coordination in the physical fields than they already have, in their own administrative areas. If their cars break down or their suits require alterations, most top level accountants or line administrators will naturally go to a garageman or a tailor. If the company needs a research chemist or a combustion engineer, they recognize these as specialized technical fields and seem quite satisfied to have the specialist relieve them of their burdens in these areas. However, in their own field of administration, they either do not recognize that specialty trades exist or are not prone to admit it. This attitude has been diagnosed as being due to reluctance to change, a feeling they adequately know all the trades in their field, or the conviction that admitting the need of a specialist in their own field would be a sign of weakness.

In this area of understanding and coordination, in my opinion, lies the open field for development and progress of the systems man's value to management, to himself, and to his profession. He must become more the architect of completely developed systems for diagnosis and less the specialist in a few techniques. It must be recognized that no one person can live long enough to become a specialist in all fields—or able to practice all the branches of his art as an expert in each. However, one can learn the technique for gross diagnosis of the various types of ailments so that an ophthalmologist is not called in when a psychiatrist is needed.

Control Techniques

Too often we think of control techniques as applying to areas other than accounting or systems. The techniques themselves should be woven into a "live system" that has intrinsic self-propelling qualities to perpetuate improvement and coordination of management aids and keep the accountant on his toes all the time as well. Skillfully employed, the operating techniques should provide management the opportunity to absorb the understanding and utilize the coordination referred to previously. To really become the "eyes of management" we must develop sharp and far-sighted vision that penetrates our own closets as well as the closets of others.

Perhaps the art or function of the coordination of techniques has not had sufficient emphasis. It is primarily an administrative—a work-through-others—quality. It is like the case of the orchestra director who cannot play well himself, yet knows music and the combinations of instruments to produce the desired overall results. It could be an architect or design engineer who in himself is master of no trade, yet knows the place for all the trades in the building, ship, or machine he is designing. In a complex enterprise, no one man or group does all the coordinating. However, if systems men are going to assume and discharge the responsibility of seeing that the coordination of the use of special techniques is accomplished for their management, then their techniques must include the intrinsic, self-propelling urge that accomplishes the results. *It is not the doctor himself who cures—it is the therapeutics he employs.*

It doesn't make a bit of difference in the long run whether the systems are put in by a systems department

itself or other areas of the company. The point I want to emphasize—there is no well performing management team that does not use systems. The basic fault we all know is that not enough managements use enough systems.

I cannot help but wonder, the more I deal with systems men, how many of them properly evaluate themselves and their attitudes and their effect on management when they talk to them.

If a systems man is a specialist and has narrowed his mind to think only in one area, such as forms design, forms control, report design, clerical work practices—he cannot blame his management for not allowing him to develop systems farther than he has been able.

I would like to say to all systems men that it is amazing sometimes how an intricate systems study will come back from a systems man, and when an administrator looks it over, the first inclination is to wonder whether the systems man used any common sense at all.

It is somewhat like the engineer who went into a small shipping and warehouse operation where there were but two men working. This unit had many kinds of material stored in different places. Some were on shelves, some were in bays, some were on racks and some were on the first floor and some were on the second floor; and they could receive a load from several docks, some of which were for trucks and some of which were for cars. An industrial engineer worked in this area for about six months and came up with a darndest number of standards—he must have had ten thousand of them—that measured the amount of allowable time to take one or two cases from the top shelf of bay one over to station one at the truck dock, and he had another standard for the same material, from the same place, to station two at the truck dock, and of course, thousands of standards for stations one, two or three at the carloading dock.

Not Reasonable

Here was an engineer who was doing his work very well and thoroughly believed he had done a good job for the company. However, the maximum number of people that ever worked in the shop was two and to follow the workers around and measure what they did, report it correctly and apply the standards, would take at least one clerk per man. No matter how you apply these standards, you might end up by showing that each man actually did only 7/8 of a day's work, but it would take two clerks and a lot of figuring to prove this, and even if you could get the men working efficiently and lay off 1/8 of each man, you still had the expense of two clerks to prove this.

How do systems people develop this attitude?—I don't know. I know one systems man who refuses to accept minor projects on the basis that there are many more large ones. Why should he waste systems efforts trying to save $20 or $30 when he can work on one that might involve thousands. I consider this a good systems approach.

I can tell you of an experience that cost a company five years in time and I don't know how many thousands of dollars. They had a very complex product line in a multi-plant operation. They decided to analyze the product cost-price-profit relationships of these various products and all the derivatives to determine which were so-called good products and which were so-called bad products.

They had spent quite a bit of time trying to analyze the product cost-profit-price relationships when they were rudely awakened to the fact that their costs system was not what it should be and they did not have all the facts for this searching analysis. They then switched to the cost system and they floundered around there for a year or more until they realized that they did not have a good standards system; and since costs were based on standards for performing operations, they could not be any better than the poor standards.

Finally they swung over to the standard problem and started to set down standard methods, standard speeds, standard waste and the various other factors for their products.

In working with standards it developed that Production Planning had been way out in left field operating on its own and using their own averages rather than standard speeds. In fact, they actually found that production planning was issuing non-standard schedules to the factory and didn't even know it. Naturally the systems men found out that they had to bring in Production Planning as well. It wasn't too long before they found that they also had to have Quality Control, methods engineers, plant layout and various other individual techniques of modern management control.

After years of work this company started back up with good standards, on good layouts, under good methods, and with production planning, and the results to the cost department produced costs, which when analyzed against prices indicated that they also needed sales policy and pricing procedures, which they didn't have before they instituted the plan.

After about five years of intensified technical effort, this company did get into the position where they were finally able to tell which of their products were good and which were not good.

There are many systems men who start the same way. They seem so anxious to move in, change the paperwork, eliminate a clerk, eliminate a report, that they miss the woods for the trees. In the systems field, I know there are specialists. It's just like in the mechanical, production or engineering field, or any other field. There are and have

to be specialists. For example, we have tradesmen who know how to wipe lead joints. We have men who know how to make seams in copper pipe. We have men who are sheet metal workers. We have men who are iron workers. We have lathers, plasterers, electricians, masons, and we have combustion engineers and many other separate fields; such is the case in systems work. However, in the other fields, we quite often have architects. An architect can draw a building and prescribe what joints need to be lead wiped, and what pipes should be copper, lead, or steel. This architect himself need not necessarily know how to perform any of these technical trade practices, but he does know the objectives, the importance and the need for them. Maybe there is a clue for systems people here. How many of us as systems men fail to recognize that all we know is how to wipe a lead joint. How many of us try to sell management on the fact that if all the joints in the place were lead wiped, they would make a lot of money. Actually we know this is not true. I think a systems man has to learn the overall approach.

Back to the case of the company which is trying to analyze its profits. A good systems man should have known enough not to start working on the analysis of profits by products in this company without taking a quick tour around and looking underneath to see whether things were rotten there as well as on top. Instead of starting to draw forms to accomplish product cost-profit-price relationships, at the start a good systems man should have surveyed the field and come back with a recommendation that would have saved this company five years of time in addition to a lot of money spent for systems and engineering work, and of course, the profit they would have made by getting their control system in earlier because they started from the bottom up, instead of the top down.

I think there is a lesson here for systems men. Trying to put controls in without good coordination of proper basic data is like trying to put icing on a cake without having a cake.

Likewise systems groups are prone to be too sensitive. They quite often like to set themselves off in a corner and set themselves up and actually act like little tin gods. They are not willing to take a back seat and quietly administer somewhat as a puppet show operator does. When looking at the puppets, you don't see the operator. He is behind the curtain manipulating the puppets by pulling strings. Quite often, in puppet shows, the puppeteer is not even seen before the show or after it. The entire applause from the audience is for the performance of the puppets. Why can't systems and procedures men act like puppeteers. Too many systems men want to stand out in front and say—"Look, I pulled the string, I did it." That is what also delays a number of systems programs in companies.

I would say that systems men must be broader minded. They must be able to see the woods instead of the trees, and they must develop a way to prevail upon management to take their advice from a systems and procedure viewpoint and let the actual development, in many cases, take place within individual areas, such as production planning, accounting, engineering.

I believe the trick in selling systems to management is to have management take systems away from you rather than have you force it down their throat. Quite a few managements don't know what systems are. When you have your foot in the door and a chance to do a systems job, I believe if you will go out of your way to have the line people with whom you are working, take up the suggestions and run up to their boss and say, "Look what we are doing," and let them get the credit for it, you will be on solid ground in developing a systems department.

From the management standpoint, I think systems is really the life blood of what holds an organization together and makes it prosper. I know that systems are present to a degree in any organization. It is only a question of whether they are formalized and work through a systems group in good coordination, cooperation with other areas, or whether they are using sandlot systems developed by themselves and not coordinated.

Much of the failure to apply systems properly is due to the quality of the systems and procedures men themselves. It's a comparatively new field. A number of the individuals in systems have just had a taste of it, and then they try to represent themselves as qualified professionals. I think a systems man should evaluate himself. He is either a technician, a specialist, or he is equipped as a top level programmer and installer of an overall systems group. There are too many systems men who only have been exposed to it and know one little phase of it to some degree that they might be called specialists in a part of the field, who try to pass themselves off to companies as men equipped to layout a program and implement the adoption of this program throughout a company. This does systems more harm than it does good. **s/p/a**

Norman A. Coan has been with Marathon Corporation nine years and is now assistant controller, industrial accounts. He has had twenty-five years of experience in control accounting in marketing and manufacturing areas of Continental Can Company, Wyandotte Chemical Company, U. S. Rubber Company and Kroger Grocery and Baking Company. He is a past president of the Northern Wisconsin Chapter, N.A.C.A.; past member of the Committee on Research and currently national director, N.A.C.A. He has received three Lybrand Awards for manuscripts in the N.A.C.A. Bulletin.

Is Conventional Tabulating Equipment

In The Twilight Zone?

by Charles E. Spring

THE PROMOTION OF PROFITS through improved systems has become synonymous with the installation of large-scale electronic office equipment. Many experts suggest that office recording and computation costs can be reduced to as little as one percent of present costs with one of these computers. While the reduction of clerical costs is accorded the most publicity and is used as a yardstick for measuring electronic application potential, actual practice discloses that the reduction of conventional tabulating costs dominates the scene at this stage of the game. Most of the pioneer business electronics applications, in practice and in blueprint, are justified by the elimination of the costs of the conventional tabulating equipment which is being supplanted. Whether this trend continues to accelerate at its current rate with the ultimate end of pushing the tabulating equipment of today beyond the point of no return poses a question of large import. It will be our purpose here to investigate the outlook for conventional tabulating equipment in light of the new electronic data processing machines.

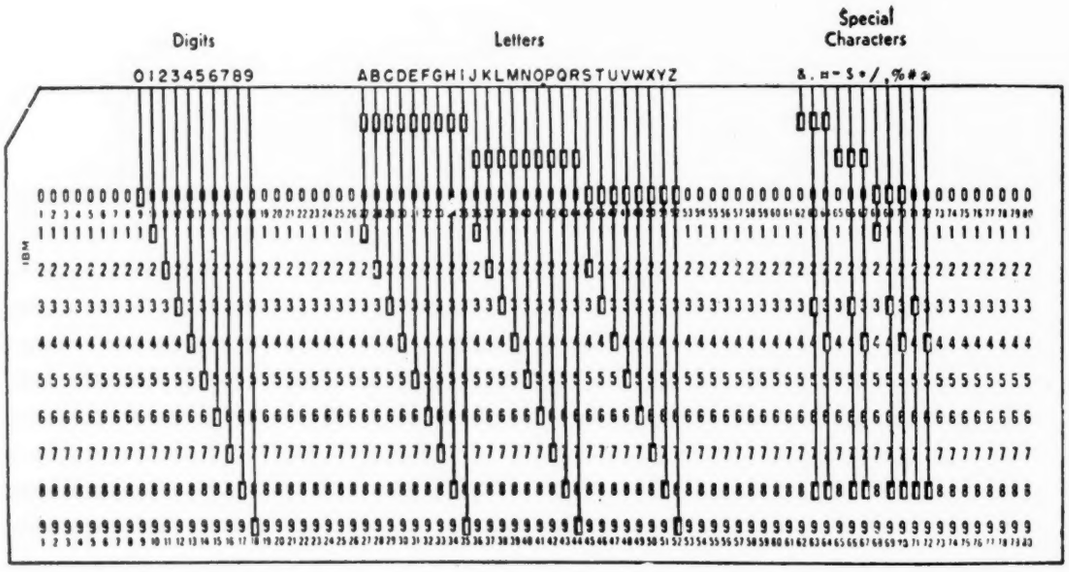
Two Systems Involved

When we speak of conventional tabulating equipment we picture an installation consisting of key punches, verifiers, collators, sorters, reproducers, tabulators, readers, calculators and similar equipment. Since the latest machines of these types contain electronic equipment and since it will, for our purpose, still be considered as conventional tabulating equipment, we need a better nomenclature than the names of machines in contrasting this equipment to the electronic data processing machines we have in mind. Actually, we are comparing two systems differing in principle even though electronic components may be present in both.

The conventional tabulating system may better be identified in this analysis by its principal storage medium, the punched card. The system is made up of groups of machines, each of which does a certain specific operation automatically on the cards under the control or supervision of an operator. These machines process cards in a pre-determined sequence of operations according to the job being completed.

All Steps by Humans

All of the steps are carried out by human beings who move stacks of cards by hand, selecting and restacking them in the various machines while controlling the flow of the data and rendering decisions as to which machines carrying out the operations are to receive the outputs of preceding operations under the planned sequence. At the same time, the particular operation of each of the machines requires the use of a plugboard wired so that the operation may be carried out by the machine in a designated manner. The plugboard serves as a control on the movements of the machine itself, dictating the programs or steps performed by each machine. The use of punched cards as the principal storage device for the system means that there must be considerable supplies of punched cards on hand which serve as a permanent storage of information. During operations, the efficiency of the system re-



Character coding, IBM card. *(Courtesy IBM)*

quires that many temporary storage cards be punched, utilized for certain steps and then thrown away after their function is ended.

Each of the individuals involved has been trained to carry out functions of different degrees of complexity, calling upon experience, manuals of operation or instructions of supervisors as the tasks are carried out. Provision is made to treat exceptions to the rule at certain stages of operation with the least disruption to the system.

Opposed to the concept of the traditional tabulating system with the various machines utilizing the external punched card storage, we have the electronic data processing system with certain types of large storage residing within the machine. Input and output are not confined chiefly to cards. Much faster operation is permitted through the use of auxiliary storage such as magnetic tapes. The system contains one control unit which moves the information at electromagnetic or electronic speeds among various locations within the system where the data can be merged, collated, sorted, added, subtracted, multiplied, and divided—all of the functions carried out by each of the many punched card machines. Several of the non-arithmetic operations can be performed simultaneously because of the capacity of the machine.

Instead of the many wired plugboards necessary in the tabulating system, our electronic system receives its instructions from its internal storage. These instructions, called programs, are in coded form and operate on the information in a predetermined sequence. The programs may be quite complex and can provide the system with a logical judgment permitting selection of alternate courses of action when the machine recognizes certain conditions. Thus, exceptions can be provided for and the system can exercise the proper action so long as they can be recognized and the course of action can be pre-planned

It can be seen then that the electronic system has the potential of operating automatically, obviating the need for human intervention. With one push of a button, the system is capable of performing not only the functions carried out by the conventional tabulating equipment, but also many of those by the people who operate and supervise the operation of this equipment.

It may be said then that the punched card itself is both a necessary and sufficient condition for our tabulating system. On the other hand, the punched card is sufficient but not necessary as an input or output medium and is neither necessary nor sufficient for internal data processing of the electronic system.

At this point, we might analyze the properties of the punched card in the hope of determining its outlook for the future. As we have mentioned, punched cards provide a means of storing and transmitting information. The information stored on the card cannot be destroyed by the equipment processing it and is secured to the card once it is prepared. Each card can bear a full unit of data and be inserted in any desired position in a complete file of similar cards. Cards can be interpreted visually as well as by machine, lending themselves to ready manual reference. They can be mailed as checks, bills or receipts and are acceptable for auditing and legal purposes.

Since the punched card bears these qualities independently of its use as a storage unit and the type of processing equipment involved, we cannot expect the future of the punched card to be determined solely by the outlook of one particular system. It would appear that the traditional 80 or 90 column punched card will be around

for some time to come. However, two factors will depress the current accelerated use of the conventional punched card:

1. The increased usage of equipment employing more improved storage facilities for its internal operation, and a faster input or output medium than cards. There is a steady pressure to push the electronic equipment into areas of more efficient operation, leading away from punched card input or output and toward tape type mediums, punched and magnetic, if this means of input or output can be selected.
2. The advent of a "new look" in punched cards. The publicity accorded the "common language" systems adequately describes the rise of punched cards of various sizes and types bearing five, six, and eight channel binary codes. Cards may be in the form of sales tags, bills, receipts, etc. While the 80 or 90 column cards may continue to dominate the punched card field if only through the sheer force of their own momentum, punched cards bearing the new look will become an increasingly important factor in the development of data processing systems based on a common language.

We can now proceed to an examination of the major advantages and disadvantages of conventional tabulating equipment as the means of evaluating its future outlook. The three chief advantages may be outlined as follows:

A. Unitized structure.
B. Improved machines.
C. Unlimited storage in readable form.

The three chief disadvantages are:

A. Excessive number of employees.
B. Excessive and slow data handling.
C. Excessive number of machines.

ADVANTAGES OF CONVENTIONAL TAB EQUIPMENT

A. *Unitized Structure*

The completely unitized structure of the machines in the tabulating system provides a degree of flexibility which offers the following advantages over the existing electronic systems:

1. Only enough equipment necessary to the processing needs to be obtained and used. The more expensive "all purpose" computer bearing considerable hardware of little or no use for specific operations is at a disadvantage with certain individual tabulating machines. One-time jobs or jobs requiring a limited amount of processing can constitute a sizable share of office operations, and this factor may lead many concerns to retain tabulating machines in addition to electronic equipment. The pre-processing of information prior to electronic data operation occasionally proves more economical and comes under this category.

   Of a similar nature, but arising through different circumstances, small offices or branch offices paralleling a home office operation will usually find punched card equipment more suitable and sufficient for its procedures. All of the arguments favoring decentralization would come into play at this point. It should be pointed out, however, that the life of this advantage for tabulating equipment may be short-lived for two reasons:

   a. Manufacturers of electronic equipment are unitizing "all purpose" computers so that much of the extra hardware can be deleted or used simultaneously in other operations if it is not needed.
   b. Electronic equipment for specific operations is being manufactured for industries or individual companies making the use of such equipment more economical than either the all-purpose computer or the conventional tabulating equipment.
2. Modifications to existing systems and the installation of new systems are accomplished more easily since only part of the system needs to be attacked at a time. The average electronic system may require many man months of a program planning to accomplish a change or the installation of a new system. This means that many improvements which might be delayed or never attempted for lack of time or capable program planners under the electronic situation may be carried out or started when only tabulating machines are involved.
3. Machine failures wreak less havoc in a tabulating system since the work can usually continue on other machines standing nearby. Those who have witnessed the scene of several harried engineers swarming over a large-scale computer while precious time slips by have some idea of the empty and helpless feeling of those awaiting the important output of the machine. This does not mean that over-all maintenance costs are higher or that breakdowns occur anywhere near as often for electronic computers. It does, however picture the importance of machine failure to the centralized operation, which is basic to the electronic system. Actually preventative maintenance techniques, machine structure and the types of machine components used for electronic equipment are improving to the point where machine failure will become a virtual impossibility as more experience is gained.

B. *Improved Machines*

Improvements to tabulating equipment are proceeding in such a way that processing times and costs may be reduced below current figures. We have already mentioned

the increased usage of electronic components to tabulating equipment. This trend may be expected to continue until most of the slower and more troublesome electromechanical machines have been replaced. Construction of the equipment with the use of mass production techniques, such as block soldering and the use of such innovations as printed circuits will not only reduce production costs but also will sharply cut maintenance outlays and machine failures. This could place tabulating equipment in an improved cost comparison position with electronic equipment and within the reach of concerns who now cannot justify equipment as highly mechanized as current tabulating or electronic equipment.

C. *Unlimited Storage in Readable Form*

All other things considered as being equal, the tabulating system has an unlimited supply of its main storage, the punched card. This factor aids systems planning since no limitation needs to be imposed by a shortage of main storage. In contrast, the electronic system has a large main storage with an upper limit which could impose restrictions on system planning. When the upper limit is exceeded, it is necessary to plan the system in parts so that auxiliary storage can be used. The system is then operating below maximum efficiency. It may be considered a further advantage for the tabulating system that its chief storage medium can be visually scanned at any step in the operation without having to convert the cards from the form used in subsequent machine operation. Under the electronic system, it is necessary to convert the medium suitable for electronic processing or scanning into some record such as a printed paper or a punched card if visual scanning is needed at certain stages of the operation. This could be considered as a duplication of effort and impairs the efficiency of the operation.

DISADVANTAGES OF CONVENTIONAL TAB EQUIPMENT

A. *Excessive Number of Employees*

The first, and considered by many as the foremost, disadvantage of the tabulating system lies in the relatively high number of employees necessary to operate the installation. In addition to the large number of machine operators and supervisors, the traditional punched card installation contains coders, plugboard wirers, card carriers, card pullers, card filers, etc. This does not include the methods and planning people who may or may not be part of the staff. The electronic system is composed of programmers, key or tape punch operators and one operator who monitors the control console. He can also handle the punched or magnetic tapes, moving them to and from the files into operation as necessary. Occasionally he must enter certain codes through the control console.

The list of shortcomings arising from the excessive number of employees is long, and we shall just mention a few.

1. High labor costs arising through regular and overtime pay as well as company contributions to "fringe" benefits.
2. High training and experience requirements.
3. Personnel problems involving turnover, replacements and unions.
4. Loss of time through coffee breaks, sickness, leaves of absence, etc.
5. Inefficiency arising through the inescapable factor of human error such as losing and misfiling cards.
6. Overhead costs necessary to maintain the higher number of employees.

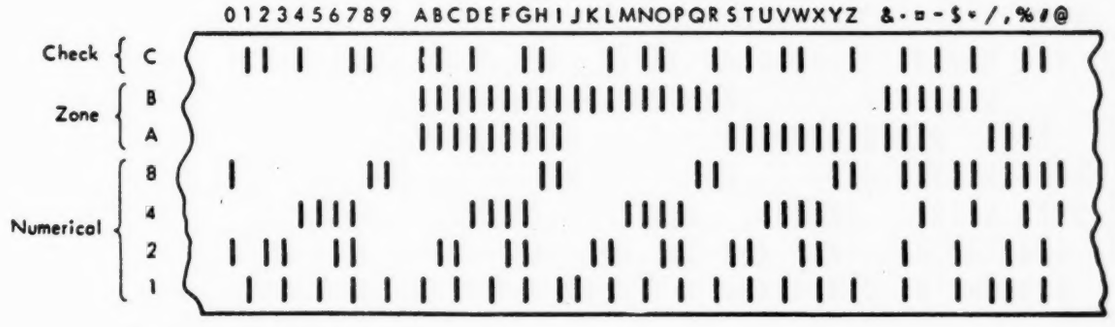
B. *Excessive and Slow Data Handling*

Our second disadvantage was apparent in our earlier discussion of the two systems when we described the vast amount of card handling and the relatively slow transmission of data in the tabulating system. The physical movement of the input data itself in the form of a card is necessary and limits the speed of transmission. In the electronic system copies of the input data are moved within the machine instead of the data itself. This permits the data to travel through the system automatically at very fast speeds. Even with electronic components the tabulating equipment cannot match the electrical speeds of the electronic system since a large amount of mechanical operation and human intervention is involved. While it may be said that several tabulating machines can be operating simultaneously in an effort to match the electronic operation, it is also possible that input and output units of the electronic system to and from the tape units can be operating in parallel. In the tabulating system, manual searches through card files constitute a major cost. Under the electronic system, this operation is swiftly and automatically completed. We have mentioned the large number of files which must be maintained for the tabulating machine operation. The electronic system reduces filing space and the attendant costs through the use of magnetic tapes which replace the voluminous card files so basic to the traditional punched card system.

C. *Excessive Number of Machines*

It has been said that the costs of the many tabulating machines and the electronic computer with which they may be replaced are comparable. However, engineers offer from their experience two disadvantages to the larger number of tabulating machines which are needed:

1. Maintenance costs in total are higher since a wider



Character coding tape (*Courtesy IBM*)

variety and greater number of machines are involved.

2. The reliability of the tabulating machines is below that of the electronic computer partly because of the nature of equipment and partly because of the large number of machines in the system.

Findings and Forecast

The advantages of the tabulating machines, particularly that of flexibility which the unitized structure provides, are strong arguments favoring continued usage. However, the major disadvantages of the tabulating system outweigh the advantages in a most significant factor —that of cost. The primary justification for introducing new systems and machines into the business office is that of overall cost reduction. It is quite evident that the continued use of tabulating machines in companies having sufficiently large volume to justify electronic equipment means that excessive costs are being incurred. It follows then that the replacement of most tabulating machines is only as far away as the culmination of the electronics program in the company involved. Certain machines, such as key punches, verifiers and card readers may be retained for some time if cards are used. However, these too will be gradually replaced as machines are acquired which prepare electronic input medium simultaneously with the preparation of source documents. Other tabulating machines, maintained at the outset as additional peripheral equipment to the electronic system will eventually be displaced by such electronic devices as tape printers, file computer or maintenance machines, etc., which are far more amenable to the electronic system.

Question of Time

We have purposely pointed our discussion in the direction of large companies and large-scale computers since the developments in this area, even at such an early date, clearly contemplate the replacement of tabulating machines. The fact that most of this equipment is leased will lend impetus to the program. Large companies with large staffs of several thousand employees can and must provide the outlay of money and men which is necessary in developing an electronics system suitable to the needs. The only question here is one of time.

Medium-size companies having from 100 to several thousand employees cannot be expected to adopt an electronics program as early or on such a scale as the larger companies. For this reason, we may conclude that tabulating machines on hand will continue in use for these companies for a considerably longer time. However, this field is considered by most manufacturers as the most fruitful for electronic computers. Many medium-size computers are being made available for these companies. Also, new machines, not classed as computers, are being offered under the "common language for integrated data processing" category. These factors can be expected to effect considerable displacement to conventional tabulating equipment but on a much more gradual basis than that for the large companies.

Mechanize Small Companies?

We come then to the smaller companies having 100 or less employees where tabulating equipment usage is nonexistent or at a minimum. The question which comes to mind is twofold:

Can these companies make use of the new electronic equipment and, if not, will the prices of the conventional tabulating machines be reduced so that these companies can now mechanize their operations on a profitable basis?

Our answer to the first part leads to one for the second. It is unlikely that small companies can afford electronic computers for a long time. However, there will be made available electronic service bureaus with all the experience and know-how of the larger companies. It may be possible, for example, for a service bureau to handle the payroll computation of a small company in a matter of minutes and to issue the checks with accompanying reports to the company within the hour. Other forward-thinking companies will develop systems along the lines

of integrated data processing putting into operation only those pieces of new equipment which are actually practical for its operation. With the small scale machines which are being developed and which lend themselves readily to integrated data processing, it is highly unlikely that smaller companies will select what we know as conventional tabulating equipment. Moreover, it is not believed that costs of conventional tabulating equipment will be reduced. The machines which are replaced and still can be used will be carefully scheduled among those concerns continuing the use of such equipment for some time. Production schedules are being carefully regulated so that an oversupply will be avoided. The transition is expected to be gradual enough that prices will not be depressed.

Twilight Zone

Summarizing all of the foregoing information, we may say that conventional tabulating equipment is on the threshold of the twilight zone. The large companies who are the greatest users are leading the way toward replacement of these machines. Gradually, many other users will follow, either with large scale computers or with integrated data processing systems employing various types of machines suited more to the particular needs of the company. In any case, the twilight zone, either by design or chance, will probably closely approximate the lifetime of the existing tabulating machines.

The punched-card itself has not yet entered the twilight zone. A long-range forecast, however, should contemplate its gradual decline in usage and the development of more effective mediums for common-language systems.

Actually, the length of the twilight zone will be determined by the work of the systems man, for it will be primarily through his efforts that the systems evolution will be accelerated. The systems man who strives to promote profits through systems improvements will be contributing to the reduction of the twilight period. **s/p/a**

Charles E. Spring recently joined the methods and planning staff of the E. I. du Pont de Nemours & Company, Inc., Kingston, N. C., Plant. He has been engaged in systems work for eight years, concentrating on tabulating equipment applications and, more recently, on studies involving electronic and integrated data processing equipment. He was graduated from Temple University, University of Chicago Graduate School of Physical Sciences and Stanford University Graduate School of Business and has attended various tabulating and electronic data processing schools, including the I B M Type 702 EDPM. Mr. Spring belongs to the Operations Research Society of America and is actively engaged in furthering the use of the mathematical sciences for improved management control.

Automation of Bank Operations

by *Ralph V. Saums*
The Farmers and Merchants National Bank, Los Angeles

IN BANKING, clerical functions are vital. They are also costly, perhaps the most costly of all banking procedures. The volume of card checks processed through the average bank is increasing, and the clerical costs involved in handling these card checks are becoming an industry problem. With paperwork on the upswing, bank executives must uncover more efficient and economic methods of cost control.

A case in point is a key punch adder system we purchased to automatize our card check punching operations. The result was immediate. Not only have we reduced clerical costs well below their previous level, but we have increased key punching production in our accounting department more than 30 per cent. Our card punching production once averaged about 1500 gross per hour; the key punch adder system now allows us to punch at a gross hourly speed of 2190 cards.

The unit we use is designed and manufactured by Systematics, Inc., Hermosa Beach, Calif. It couples a Model 024 IBM key punch with a Monroe Model 611 adding machine and enables the operator to indicate the amount of each check run through the system on the adding machine tape while simultaneously key punching each individual check. By giving the operator a proof total on the adding machine that automatically corresponds with the total amount of all the checks key punched, the unit eliminates key verification or proof listing the checks in groups by running them through an IBM accounting machine.

We use the unit on all card checks, including personal checks, dividend payments, and personal money orders, which are essentially card checks. As long as card checks are in use, banks will find value in better ways to process them. **s/p/a**

Distribution Cost Control and Analysis

by Professor Thomas A. McGann
Marquette University

A COMPANY'S COSTS come from production or distribution effort. Production cost control covers all costs above gross profit. Distribution cost covers all costs below gross profit. Distribution cost control relates to measurement of performance of distributive costs to a predetermined goal. Distribution cost analysis is concerned with comparison of present and alternate methods of marketing and the study of costs and their effects on profit. Thus, examination of warehouse costs against the budget for warehouse costs is control; comparing warehouse costs in company-owned facilities with rented facilities is analysis.

What are Its Values to Management?

1. It fills a management need for factual information on marketing costs, not supplied by the ordinary statements of the company.The common profit and loss statement is prepared principally for the benefit of stockholders, credit-granting, and government agencies and hence is not concerned with any particular phase of operation. The various production costs statements are management aids to production control only. Distribution cost data are needed to help management in its marketing controls.
2. The movement from a seller's market to a buyer's market, coupled with increasing competition, has changed the cost mix of the consumer's dollar from perhaps 90% production cost and 10% distribution cost to 40% production cost and 60% distribution cost. While this change was taking place, great emphasis was placed on productive costing. Now, with product costing well developed and technology in a highly advanced stage, American economy is faced with the situation of having a productive potential far in excess of its capability to absorb. To meet our productive potential and to raise our standard of living, the economy must distribute more goods and services and must do this efficiently; this requires distributive cost knowledge, control and analysis.
3. It enables a company to evaluate various methods of distribution, as selling to wholesaler rather than to retailer.
4. It requires a review of present marketing structure, oftentimes developed by superimposition, and thus focuses attention on structure.
5. It requires determination of functions and their costs in fulfilling the marketing program.
6. It permits assignment of responsibility for costs and also permits measurement of performance to responsibility.
7. It focuses attention on inefficiencies in operating procedures, as in order-getting and order-filling.
8. It encourages construction of profit and loss statements by products, by customers, by channels of distribution, by salesmen, by unit of sale, by advertised and unadvertised merchandise, by high and low margin lines, by styles and sizes of goods. Such statements enable management to determine weaknesses as well as strengths in its operation and thus aid in overcoming weaknesses and in improving strengths.
9. It helps in the preparation of a more effective budget.
10. It fosters the eventual establishment of standard distributive costs, so that costs can be controlled at the point of origin.
11. It gives management the knowledge that its distributive costs are controlled. **s/p/a**

What is Directed Energy in Systems?

by Jerome Barnum

DIRECTED ENERGY is a term used to define a particular approach to higher productivity and increased effectiveness. It is aimed at getting results the economical way while at the same time producing some highly important concomitant benefits in terms of the kind of world we leave behind for our children and our children's children.

All management is concerned with the utilization of "asset energies" . . . Man energy (both the Manual kind and the Mental variety) . . . Material energy (the things we use to produce goods and services) . . . Machine energies (the tools of production) . . . Money energies (the medium for trading the other energies) . . . Market energies (the intake pipe) . . . Methods energy (the "how" of the job) . . . and Management energy (the way the whole job is planned, coordinated and controlled).

If all of these energies existed in unlimited amounts there would be no problem . . . and no room for systems work of any kind. All energies are spent to produce some end-product or service, but unfortunately they don't always reach that destination. Every mature management man knows that much of what is poured into a business is syphoned off in the form of *misdirected effort and waste*. The rub is that these energies don't benefit anyone. If a way can be found to capture these losses (manhours, materials, downtime, money, ideas, and other asset energies) everyone will benefit and living standards will skyrocket.

Directed Energy is not a speed-up. Better direction of the same energies is the key . . . not more energy. Better direction spells *better living*. Best of all, everyone benefits!

The Consumer must benefit first . . . through more and better products and services at less cost. The Co-operators must benefit next (every single person in the outfit from the President to the Janitor) through a share in the rewards in the form of rising wages, shrinking hours, and other benefits. The Creative Thinkers must also share (including imaginative systems men) through cash payments and direct recognition for their inventions, improved products, and better methods.

Finally the Co-owners (the people who put up the hard-earned cash) deserve a share too . . . but not all. This isn't as hard on owners as it sounds. For example, suppose the shareholders are now getting 100 percent of the technological savings coming out of systems work and that they presently amount to a net of $10,000 per year. If a way could be found to increase those savings to $100,000 per year and the owners took 25 percent, that would be $25,000 or 150 percent more than they are now getting. Not a bad deal for owners. No one is so wise as

to be able to say precisely how much each of these four interests should get in the gains of technological advancement but what is wrong with starting your thinking about the subject with a four-way, 25 percent, split each in mind.

If you give one fourth of your savings to consumers in the form of lower prices and better products, and at the same time find that your employees deserve a fourth you will find that you have created the climate for a real increase in living standards without the specter of inflation peering over your shoulder.

If you will take another fourth and hand it out willingly to the people who thought up the good ideas that made the saving possible (or to a Research Fund if you can't identify them) you'll keep the fresh new ideas flowing. And finally make sure you don't short-change your shareholders: Give them the remaining fourth. This provides the built-in incentives for progress and the economic formula for giving it substance and meaning.

Since technological advancement is the key to plenty it follows that when systems men show up in a department everyone should jump up and down and say "Goody, here comes the Systems Man to improve our jobs, which will increase productivity, which will raise standards of living. Aren't we lucky to have him around." Very few of us are greeted that way, I'm sure.

Frankly, the answer is the same all over the world. Why? I think, based on the experience of our consultants, that the simple answer is that we go about the job in the wrong way, that what we do runs counter to fundamental human nature, and that we have all spent years kidding ourselves into believing that the trouble was the "other guy" instead of ourselves.

One thing that stands out, regardless of whether we are working in Maracaibo, Venezuela; Bergen, Norway; or Pittsburgh is that people . . . their basic hopes and aspirations . . . their fundamental motivations . . . their reactions . . . are much the same. If we want to learn how to live in a technological age we have to learn more about people and the things that motivate people.

Systems work consists of two parts: The mechanics of making the improvement (tools and techniques of the profession) or the *Science* of Management is one part . . . and not too difficult for a competent person. The rest of the job involves the "humanics" of improvements or the *Art* of Management. Systems work seems to me to be about 10 percent "mechanics" or science, and about 90 percent "humanics" or art. This Art of Management is also relatively "simple" . . . not to be confused with "easy". It requires belief, sensitivity, and a willingness to practice a few pleasant behaviour guides twenty-four hours a day *minimum*.

While culture and behaviour patterns will vary around the world, a few things will remain common. All men are motivated by certain basic motivations or drives. It is the same everyplace because human nature is universal. It has always been that way because the inner man is unchanging. Something that is both universal and unchanging should be accepted as a going business, and all of us with any sense of humor should recognize that man will be the same long after we are all dead and gone. If you are guided by a deep spiritual foundation in your life you can also conclude that God in all of His wisdom meant

man to be the way he is and that our job is not to change him but to change our way of dealing with him. The law of intelligent action has been said to consist of knowing how to accept conditions as you find them and then proceed to make them work out to the general advantage.

St. Thomas Aquinas put it this way: "God grant me the serenity to accept the things I can not change . . . courage to change the things I can . . . and wisdom to know the difference."

What is it that can't be changed? What is it that we may be forgetting in systems analysis that turns people against this fine work.

Human Nature

The unchangeable part of business and the systems operating in business is *human nature* . . . the basic motivations, drives, and inner aspirations of the people who do the work. Examine these fundamental human needs (do it by examining *your own* motivations if you like) and you will find that all people crave at least three minimum fulfillments: (1) Security, (2) Recognition, (3) Self-Expression.

My observation world-wide is that all systems work now carried on by the conventional techniques violates all three of these normal human cravings in the eyes of everyone except the systems men themselves. If the way a person acts and reacts is based on his inner chemistry, as most people would agree, and business management and systems specialists are pouring in ingredients that produce violent "chemical reactions" then it would be naive to wonder why people do not jump up and down with joy when a systems man appears . . . even though his work may benefit them *in the long run!*

The desire for security means more than the sense of well-being that comes with knowing that you are not going to be tossed out on the street as a result of an improved process or system, although that assurance is definitely a prerequisite. The deeper craving is to be accepted as a participating, full grown member of the human race, with dignity and considerations commensurate with that exalted status. Many forward-thinking companies give guarantees in writing that no one will lose employment as a result of the development of an improved way of doing the job. That is a good start, if properly handled, but it is necessary to show by way of company policy and day by day action that the company truly believes that of all the assets on hand, people are *the most valuable . . . the most important.*

Negative Reactions

A method must also be found for doing the systems work in a way that enhances each individual's sense of personal worth and first-class citizen outlook on life. This definitely is not through a systems approach that injects a few experts on the scene to analyze what is now being done, dream up a supposedly better way, and dash into the front office for approval. If you do it this way, it simply makes the people who have to do the work hate you with a beautiful passion because it has robbed them of the sense of personal worth so necessary to confident living. The hatred is expressed in various forms of resentment of the criticism implied in your work (and all normal men, including systems men, resent criticism).

These normal and understandable negative reactions also come out as stubborn inertia about the improvement, silly defense of poor methods, blind resistance to change, and frequently subtle sabotage of the improvement if you bull it through.

Recognition

The desire for recognition is the real vein in the undiscovered gold mine of human motivation in business. Every normal man wants to do good deeds and have others take note of them. Everyone wants to be assured that he is best at *something*. The file clerk in the office who has just about gotten to the brink of well-being in her job is now visited by the systems man who in a few seconds destroys that feeling that she can be best at anything at all. A way must be found to do systems work in a way that develops thriving, fully matured people who themselves find these improvements and are permitted to enjoy the sunshine of recognition that goes with it.

The desire for self-expression is another basic drive that is violated by almost every systems installation. Stated simply, it is that everyone wants to get into the act, to participate, to have the feeling he belongs. Our systems man is the fellow who finally destroys irrevocably and for all time the hope of satisfying this human craving that is like hunger or thirst. Instead of meeting that

urge that makes humans human, he comes along and says in effect "no, no, no, don't do it that way any more. That is a *stupid* way. Now *I* have developed an *intelligent* method. Follow *my* method." All the while the normally motivated man is *standing there waiting for him to shut up so he can tell him the right way to do it.*

Some years ago we called our people together and reviewed everything we were doing as consultants and tried to make an honest self-appraisal. We found that almost all of our work violated most of the normal human motivations. We decided to do something about it and the way we work today bears practically no resemblance to what we did previously. The term Directed Energy has been used to describe this new approach. Suppose you were following it. How would you do your job differently?

Training for Yourself

The first step would be new training *for yourself*. You would come together with eleven other systems men for an intensive eight hour a day Round Table for two weeks during which time you would study human motivations, psychology, sociological implications of your work, economics of productivity, public speaking, conference leadership, role playing, and how to train other people in a simplified application of industrial engineering to systems work using interest-provoking visual aids to quickly teach participating employees and supervisors how to make the charts and analyses required for systems improvement.

Secondly you would go back to your company and stop *doing* systems work. You would move off the playing field onto the bench where you could coach, aid, counsel, and advise while everyone else made the improvements and got the credit for them. To do this you would conduct Round Tables of your own where you would teach others to do the systems analysis . . . the people who do or control the work.

Third, you would act as the *catalyst* for systems thinking and be the helpful "service department" for improvements of all kinds. You would see that they rapidly went to the approval body, possibly "junior boards of directors", and were acted upon with dispatch. You would help work out the installation bugs, see that necessary equipment and forms were on hand when needed. But never, never, never would it be *your* improvement or *your* system. It would always be the exclusive property of the people who dreamed it up under your skillful help.

In other words you would have stopped being a doer and become a teacher. You would have added to your systems skills new skills in human behavior motivation. You would be more concerned with the *Art* of Management than in the past, while retaining your good understanding of the Science of Management. You would, in effect, stop doing systems work and start doing humanity's work. It sounds slightly egg-headed but the truth is that it is not only good morals but it is also *good business.* One company of only 300 employees that had been studied and restudied by the systems men for years saved $280,000 per annum as a result of the improvements put into effect by the first Round Table group during the first nine months of their Directed Energy Program.

In terms of the systems man it ushers in a new phase of his life which is deep in personal rewards and inner satisfactions.

The goal of thoughtful managements should not be higher productivity for efficiency's sake. It should not even be higher standards of living for all. The true ultimate goal must be a *higher standard of life.* A life where each individual develops in a climate of personal satisfactions coming as a natural result of working in a way that meets human needs. **s/p/a**

Jerome Barnum is director of Jerome Barnum Associates (and Energia Dirigida, S. A., a Latin American subsidiary) a management consulting firm in Scarsdale, New York. The firm has done extensive pioneering work in the fields of human relations and techniques for increasing productivity. It serves business organizations and public agencies throughout the United States and twelve foreign countries through affiliates, subsidiaries and branch offices in the Far East, Europe, Canada, Mexico, Central and South America. Mr. Barnum has been closely identified with SPA since its founding. He delivered the opening address at the first national systems meeting in New York. In addition to guiding the work of Jerome Barnum Associates and its sister organization, The International Institute of Directed Energy, Mr. Barnum lectures at the Engineering University in Germany, the Wharton School, and other institutions.

Areas for Improvement

Clerical management personnel in large, medium and small firms list the following areas for developing more competent offices: Get and hold better personnel; Records management; Control idle time; Better forms design and control; Combine payroll deductions; Use sales statistics; Office workload analysis; Facilitate customer service; Reduce number of files; Improve order handling; Stop wasting space; Improve employee morale; One-time carbon forms; Eliminate hand posting; Cut communication costs; Policy on small supplies; Individual production.—Source *The Office*, January 1956.

BOOK Reviews

Reviewed by Richard Pomeroy,
Fairbanks Associates, Greenwich, Conn.

AN INTRODUCTION TO AUTOMATIC COMPUTERS, *A Systems Approach for Business*

By Ned Chapin (245 pp., 1955, $9.00); available from the author at 407-0 Gunsaulus Hall, 3140 S. Michigan, Chicago.

This book is a fine textual presentation which amply lives up to its title. This is a thorough, well-prepared work by an author who is both a teacher and an authority in the field of business electronics. Following two introductory chapters devoted to what an automatic computer is and what it can and cannot do, the book is divided into two sections, each an entity capable of being read and understood independently.

The first section is devoted to the place of the computer in industry and covers completely all phases of the study and the introduction of a computer into business. This section is a how-to presentation of very high standard; It will tell you not only how to make a computer survey, but who should do it, how much these people cost, how the report should be handled and presented, how the computer, if justified, should be sold to company personnel both before and after purchase, training requirements—in short, almost all of what you need to know to set forth in this area on a sound footing.

The author's approach to the problem of computer acquisition is authoritative and realistic; it dispels much of the romantic notion and blue-sky thinking in this area.

The second section of the book is devoted to the delineation of computer fundamentals including historic development, basic design principles, an introduction to the Boolean, "And-Or-Not" principles in the form of a simple game, the computer components themselves, and the basic principles of programming. The chapters devoted to components are written for the person at the introductory level and do not drift into higher mathematics.

Section IV is concerned with the Humanities of Automation and is an attempt to view the field of automation from its psychological, sociological, physiological, economic and neurological standpoints. While some of the points made in this section are moot, this part of the book does include a good survey of advances (both present and probable) made in a number of closely related, seldom considered jobs.

Section V, The New Techniques, discusses briefly a number of important areas lying at the border and directly affecting the automation trend: operations research, applied cybernetics, automatic programming, stereatronics (miniaturization), ultrasonics and information theory. This section is extremely interesting and the references to further reading are aptly chosen. The final section is a discussion of future developments and those "Just Around the Corner."

By far the greatest contribution of this book lies in the section on "hardware" which is a long-needed and up-to-date survey of all office automation components now on the market or soon to be available. To systems personnel making feasibility studies this section alone will prove itself worth much more than the price of the book. Along with a general discussion on component functions, computer arithmetic, and company applications and experience, Mr. Brown presents a remarkably comprehensive survey of equipment in the office electronics field. Each piece of equipment from the simple punched tape handlers to the giant computers is discussed, priced and pictured, and identified as to the manufacturer. To enhance its potential value and use, a service is available from the parent firm whereby at an annual cost of $25, these pages will be updated as new equipment is announced.

Another short chapter of interest is titled, "Helpful Reading Material on Electronics, How to Keep Abreast of Developments"; it lists periodical publications available.

The book is loose-leaf, with 8½" x 11" sheets in a flexible cover binder. Unfortunately the book does not have an index, since readers will undoubtedly refer back to it frequently. **s/p/a**

OFFICE AUTOMATION—*Integrated and Electronic Data Processing*

By R. Hunt Brown, Automation Consultants, 1450 Broadway, New York City. (283 pp., 1955, $12.50).

As its title suggests, this volume covers the entire IDP and EDP fields. In addition it sallies briefly into peripheral areas to give the reader some insight into the mysterious fields of scientific research which underlie the practical developments in the business electronics field.

Section I of the book is a general discussion of automation, its background and impact, applications and limitations. Section II is devoted to "hardware," a term Mr. Brown uses to include all electronics components, rather than only those related to automatic computers.

The third section is devoted to a discussion of the new methods and procedures in the business electronics area. At the same time reading this section will further the basic knowledge of many a person with extensive experience in the computer field.

An appended section covers the comparison of computer equipment now or soon to be available. It covers 25 different computers and furnishes much information in questionnaire form of such facts as component cost, performance and general characteristics of equipment. This section of the book alone should result in substantial savings of time and money for those organizations seeking information about such machines.

The book, which consists of 8½" x 11" pages in a hard cover binder, contains an excellent basic glossary and an index. **s/p/a**

Supplement to "Electronics in Business

The first Supplement to "Electronics in Business: A Descriptive Reference Guide," brings up-to-date the material contained in the basic study which was issued in July 1955. It is a good reference book for the companies undertaking electronics feasibility studies. It is available. at $3.00 per copy, from the Controllership Foundation, "the research arm of the Controllers Institute of America." at 2 Park Ave., New York 16, N. Y.

Worth Reading

"How to Increase Control and Reduce Cost of Processing Engineering Documents"—*Management Methods*, January 1956.

Over 150,000 engineering drawings are on microfilm mounted in punched cards to facilitate finding and filing. If copies of a drawing are needed, a 10′ x 16′ printer is available. Cost of a single microfilm drawing is about 10c.

"How some Companies are Planning and Controlling their Operations"—John V. van Pelt III, *The Controller*, December 1955.

Comparison and critique of control techniques used by such companies as Cleveland Electric Illuminating, General Electric, Gates Rubber, Ford, DuPont, Koppers, and Kendall.

"Need for Systems Standards and a Body of Knowledge"—Bruce L. Smyth, *The Office*, January 1956.

Discusses two principal needs in systems and procedures: (1) a means of accurately measuring cost and output of our clerical systems (2) a means of integrating our knowledge of systems and procedures into a body of information which can be conveyed to others.

"Peg Strip Record Keeping"—Richard Neumaier, *The Office*, December 1955.

Extensive illustrated discussion of several types of peg board arrangements and description of varied uses for which they are most appropriate.

"A Pegboard Inventory System"—John Hockman, *The Office*, December 1955.

Detailed illustrated description of pegboard control used in wholesale or retail merchandising. Author claims it is applicable to finished goods inventories where branches or customers order several items at a time, or for materials in a job cost system where schedules of materials in varying combinations and quantities are drawn for different jobs.

"Why Every Company Needs a Filing Manual"—A. A. Deter, *Office Management*, February 1956.

Detailed exposition of the purposes served by a filing manual, considerations involved in determining who should prepare it, how it should be written and what it should contain.

"Automation is an Evolution, Not a Revolution"—W. P. Livingston, *Office Management*, January 1956.

Review of development of mechanization and an evaluation of the advantages of computers over punched cards. Concludes that punched cards installations will continue to play a vital role.

"More than 3% Return"—George C. Boddiger, *Office Executive*, December 1955

Discusses the following aspects of methods program: benefits to be derived, objectives, who should be responsible, qualifications of methods men.

"Electronics for the Office—How Much? How Soon?"—Joseph H. Pittenger, *NACA Bulletin*, February 1956.

Brief general consideration of the meaning of integrated data processing, how use of electronic equipment can be justified, and steps to follow for an orderly investigation by interested companies.

"'Utility' Billing System Needs No Daily Posting"—A. H. Geisler, *The Office*, February 1956.

Detailed illustrated description of a single monthly posting billing system used by a telephone answering service. Author claims 3,000 bills are prepared monthly in 45 hours with a standard accounting machine. A suggestion is made for adapting the system for use by regular commercial companies.

"Distribution of Incoming Mail"—Fred G. Meyer, *Office Executive*, December 1955.

Brief description of how one company with 300 office employees improved its mail handling. Daily mail included 300 to 1,000 remittances totaling $200,000 to $500,000.

"A Stairway to Budgetary Control"—M. I. Evans, *NACA Bulletin*, December 1955.

Extensive discussion of a nine step plan to design and install a system for budgetary control: (1) Define the objectives of the installation (2) Decide on the basic approach (3) Analyze the situation (4) Design appropriate techniques and procedures (5) Clarify line and staff responsibilities under the budget (6) Plan the installation program (7) Recruit and train personnel (8) Measure and maintain the system (9) Use the information produced.

A Manager's Stake in Systems

"Systems By Popular Vote?"

No. 7 of a series by Leslie Matthies

IN ANY ORGANIZED GROUP of people there seems to be a tendency for the organizaiton to disintegrate—to fly apart. Men and women like to be complete in themselves. They want to build complete "companies-within-a-company", and they will try to do it.

If operating people are allowed to build their department walls high, coordination between departments will suffer.

No manager wants this to happen. He wants his "team" to function as a team, not as complete little empires within themselves. He doesn't want the red-tape that must come when departments build up their administrative "tariff walls".

A system counteracts this empire-building tendency. A system tends to lower departmental walls, to improve the "lateral relations" between departments, and to force the organization to work as a team.

A system, like a budget, must restrict. People, of course, don't like restrictions. So they say:

"Your procedures are too brief."
"The system hog-ties me."
"When I want a form, I want it."
"Too much detail."
"I don't like your format."
"Now, the way we should do it is—"

As you listen to all this, you wonder if these people are right, or wrong.

Actually, systems is a management *prerogative!*

A manager must accept these facts: (1) Systems ties together the effort of the organization. (2) Systems insures control, reasonably rapid action, and lowest cost. (3) To insure coordination, systems tends to restrict. (4) No technique that controls people can be expected to achieve popularity honors. (5) A systems' value can only be judged on its results.

Any systems analyst is ready to listen to all suggestions or complaints. He also tries to make each system palatable to the operating people. He gets their advice, makes the new system *theirs*, in-so-far as he can. But he cannot compromise to achieve popularity. Actually, after people are accustomed to a straight-moving, direct system, they'd never go back to anything else.

The manager *must* pin his faith on his systems man and his systems plan.

If the manager will make systems *his* prerogative, systems will get results for him and his organization. **s/p/a**

17 Rules for Plainer Letters

To improve correspondence and paper work in federal agencies, the General Services Administration has produced a correspondents' manual which lays down 17 rules for better letters:

1. Don't make a habit of repeating what is said in a letter you answer.
2. Avoid needless words and needless information.
3. Beware of roundabout prepositional phrases, such as *with regard to* and *in reference to.*
4. Watch out for nouns and adjectives that derive from verbs. Use these words in their verb form more frequently.
5. Don't qualify your statements with irrelevant *if's.*
6. Know your subject so well you can discuss it naturally and confidently.
7. Use short words, short sentences, and short paragraphs.
8. Be compact. Don't separate closely related parts of sentences.
9. Tie thoughts together so your reader can follow you from one to another without getting lost.
10. Use specific, concrete words.
11. Use more active verbs.
12. Don't explain your answer before giving it. Give answers straightaway, then explain if necessary.
13. Don't hedge. Avoid expressions like *it appears.*
14. Be human. Use words that stand for human beings, like the names of persons and the personal pronouns *you, he, she, we* and so on.
15. Admit mistakes. Don't hide them behind meaningless words.
16. Don't overwhelm your reader with intensives and emphatics.
17. Do not be obsequious or arrogant. Strive to express yourself in a friendly way and with simple dignity.

The manual, which is entitled "Plain Letters," is available at 30 cents per copy from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Systems and Procedures Association of America

NATIONAL OFFICERS

President
BRUCE L. SMYTH
Federal Reserve Bank of Chicago
230 So. La Salle St.
Chicago. Ill.

~~*Vice* President~~
ALLEN Y. DAVIS
Charles Pfizer & Co.
630 Flushing Ave.
Brooklyn 6. N. Y.

Secretary
~~STEPHEN T. FORBATH~~
~~Dennison Mfg. Co.~~
~~Framingham, Mass.~~

Treasurer
JOHN W. HULEN
Trenton Retirement Service
Div. of Safeway Stores Inc.
609 Sutter St.
San Francisco 1, Calif.

National Committee Chairmen

Chapter and Membership Promotion
W. C. GILL
Douglas Aircraft Co.
2000 North Memorial Drive
Tulsa, Okla.

Budget and Audits
DON E. SLEE
Mutual Benefit Life
300 Broadway
Newark, N. J.

Education
WILLIAM B. WORTHINGTON
3837 Calle Guaymas
Tucson, Ariz.

Public Relations
DON TITUS
American Cyanamid
30 Rockefeller Plaza
New York, N. Y.

International, Regional Meetings
CHARLES C. CHASE
M. W. Kellogg Co.
P.O. Box 469
Jersey City 3, N. J.

Constitution, By-laws
COURTLANDT W. PIEHLER
Wyman Gordon Co.
Worcester 1, Mass.

Publications
VICTOR LAZZARO
Merrill Lynch, Pierce, Fenner & Beane
70 Pine St.
New York 5, N. Y.

Research
F. WALTON WANNER
Standard Oil Co. (N. J.)
30 Rockefeller Plaza
New York 20, N. Y.

Employment
CARL W. FALK
Union Switch & Signal Div.,
Westinghouse Air Brake Co.
1789 Braddock Ave.
Pittsburgh 18, Pa.

ISM Meeting
JOSEPH A. MACQUEEN
Alan Wood Steel Co.
Conshohocken, Pa.

SPA Chapters and Presidents

ALBANY, Thomas Paskewich, Cluett, Peabody & Co., Troy, N. Y.

BALTIMORE, W. J. Smith, Jr., U. S. Fidelity & Guaranty Co., Baltimore 3, Md.

BAY STATE, L. L. Kilfoyle, Watertown Arsenal, Watertown 72, Mass.

BOSTON, Waldo Nelson, John Hancock Mutual Life Ins. Co., 200 Berkeley St., Boston, Mass.

CARACAS, Lawrence F. Neumann, Creole Petroleum Co., Apartado 889, Caracas, Venezuela

CHICAGO, Fred W. Hennings, Allstate Ins. Co., Skokie, Ill.

CINCINNATI, Walter A. Schmidt, Champion Paper & Fibre Co., Hamilton, Ohio

CLEVELAND, Geo. O. Griffith, Ohio Boxboard Co., Rittman, Ohio

CONNECTICUT, E. W. McNamara, The Bassick Co., Bridgeport, Conn.

DALLAS, John L. Primm, Texas Employers' Insurance Assn., 423 So. Akard, Dallas,, Texas

DENVER, C. M. Melby, Public Service of Colorado, 900 15th St., Denver, Colo.

DETROIT, Edward C. Hagen, Square D Co., 6060 Rivard St., Detroit, Mich.

HOUSTON, Henry Hopkins, Humble Oil & Refining Co., P. O. Box 2180, Houston, Texas

JOLIET, Melvin C. Schroeder, Elgin, Joliet & Eastern Ry., 208 So. Lasalle St., Chicago, Ill.

KANSAS CITY, P. J. Manley, Cook Paint & Varnish Co., No. Kansas City, Mo.

KEYSTONE, W. H. Enters, Radio Corp. of America, Bldg. 17c-1, Camden, N. J.

KNICKERBOCKER, A. M. Piscatella, American Airlines, Inc., 100 Park Ave., New York

LONG BEACH, Marshall E. Dunn, 3973 Gardenia Ave., Long Beach, Calif.

LOS ANGELES, Leslie Matthies, 1009 East Nutwood Ave., Fullerton, Cal.

MANHATTAN, E. G. Benser, Commercial Investment Trust, Inc., 1 Park Ave., New York

MILWAUKEE, R. A. Rietz, A. O. Smith Corp., 3533 North 27th St., Milwaukee 1, Wis.

MONTREAL, V. F. Davies, P. S. Ross and Sons, 360 St. James St., W., Montreal, Que.

MOTOR CITY, Douglas B. Hoyt, 3321 Middlebury Drive, Dearborn, Mich.

NEW HAMPSHIRE, Arthur Hammer, Route 2, Box 209, Manchester, N. H.

NEW YORK, C. B. Shafer, New York Life Ins. Co., 51 Madison Ave., New York

NO. NEW JERSEY, C. W. Schreiber, American Cyanamid Co., Bound Brook, New Jersey

OKLAHOMA CITY, N. S. Jarnigan, T. J. Bettes Co., 528 Liberty Bank Bldg., Okla. City, Okla.

ORANGE BELT, E. C. Cowgill, Convair, P. O. Box 1011, Pomona, Calif.

PACIFIC NORTHWEST, Al Koeppe, National Bank of Commerce, Seattle, Wash.

PALISADES INTERSTATE, John R. Farmer, 142 W. Allendale Ave., Allendale, N. J.

PHILADELPHIA, J. A. McQueen, Alan Wood Steel Co., Conshohocken, Pa.

PITTSBURGH, C. H. Olson, Duquesne Light Co., Pittsburgh 19, Pa.

PROVIDENCE, W. R. Foyle, 61 Holland Ave., Riverside, R. I.

RICHMOND, T. R. Swann, Richmond Dry Goods Co., 11-23 S. Seventh, Richmond, Va.

SAN FRANCISCO, Robert Reilly, Bank of America, NT & SA, 300 Montgomery St., San Francisco, Calif.

SAUDI ARABIA, H. A. Kienholz, PO Box 1721, Dhahran, Saudi Arabia

ST. LOUIS, J. C. Wotawa, Federal Reserve Bank, 411 Locust St., St. Louis, Mo.

SOUTHERN CALIFORNIA, R. W. Manderbach, 2050 Empress Ave., So. Pasadena, Calif.

TORONTO, G. K. MacDonnell, The Bank of Nova Scotia, 44 King St. West, Toronto, Ont.

TULSA, Snowdon Parlette, Douglas Aircraft Co., 200 N. Memorial Dr., Tulsa, Okla.

TWIN CITIES, Leslie G. Marnie, Minnesota & Ontario Paper Co., Minneapolis, Minn.

WASHINGTON, D. C., F. W. Garrettson, 2510 Hillcrest Ave., Baltimore 14, Md.

WINDY CITY, Wallace M. Carrithers, A. B. Dick Co., 5700 W. Touhy Ave., Chicago 31

WISCONSIN VALLEY, Harold H. Bessey, Employers Mutual of Wausau, Wausau, Wisc.